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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,506	06/26/2007	Takashi Sawaguchi	0003187USU	2329

27623 7590 08/10/2009  
OHLANDT, GREELEY, RUGGIERO & PERLE, LLP  
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STAMFORD, CT 06901

EXAMINER
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REDDY, KARUNA P

ART UNIT	PAPER NUMBER
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1796

MAIL DATE	DELIVERY MODE
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08/10/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/591,506	<b>Applicant(s)</b> SAWAGUCHI ET AL.	
	<b>Examiner</b> KARUNA P. REDDY	<b>Art Unit</b> 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-3 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>11/1/2006</u> . | 6) <input type="checkbox"/> Other: ____.  |

### **DETAILED ACTION**

1. Claims filed on 9/1/2006 are made of record. Claims 1-3 are currently pending in the application.

### ***Specification***

2. The abstract of the disclosure is objected to because it should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. Appropriate correction is required. See MPEP § 608.01(b).

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3 are rejected under 35 U.S.C. 102(a) as being anticipated by Chishima et al (JP 2004-168834 A).

Chishima et al disclose an organic polymer containing inorganic nano microparticles by polymerizing the monomer in a supercritical fluid containing mesoporous inorganic nanoparticle, a monomer and a polymerization initiator. The

Art Unit: 1796

method provides excellent impregnation of monomer into nano microparticle. Silica having a particle size of 40 nm and monomer MMA are polymerized in super critical CO<sub>2</sub> (abstract). Given that silica nanoparticles are impregnated with MMA and then MMA is polymerized in supercritical CO<sub>2</sub> as in instant invention, it is the examiner's position that network structure is inherently present in the polymer composite of Chishima et al.

Therefore, Chishima et al anticipate the present claims.

5. Claims 1-2 are rejected under 35 U.S.C. 102(b) as being anticipated by Pope et al (J. Mater. Res., Vol 4, Pages 1018-1026).

Pope et al disclose transparent silica gel polymer composites by impregnation of porous gel with organic monomer and polymerization in situ (abstract). In the composite of Pope et al, the phase dimensions are on the order of 100 angstroms (page 1018, col. 1, lines 36-37) which reads on the nano silica. The average pore diameter of silica gel is 156 angstroms (page 1019, col. 1, lines 10-12) which reads on nano pores. Porous silica gels were impregnated with MMA and the samples were polymerized (page 1019, col. 1, lines 26-30). Given that nanopores of nanosilica are impregnated with MMA and then MMA is polymerized as in instant invention, it is the examiner's position that network structure is inherently present in the polymer composite of Pope et al.

Therefore, Pope et al anticipate the present claims.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1796

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459

(1966), that are applied for establishing a background for determining obviousness

under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pope et al (J. Mater. Res., Vol 4, Pages 1018-1026) in view of Zerda et al (Macromolecules 2003, 36, 1603-1608).

The discussion with respect to Pope et al in paragraph 5 above is incorporated here by reference.

Pope et al is silent with respect to supercritical carbon dioxide fluid.

However, Zerda et al teach that incorporation of nanometer scale silicates into a composite is problematic due to increase in viscosity. The viscosity of monomer-silicate mixture is such that the homogeneous dispersion is not possible and defect formation is common. The challenges of high viscosity are overcome by using supercritical CO<sub>2</sub> as a reaction medium. Homogeneous dispersion of monomer, initiation and subsequent polymerization all occur under a lower viscosity in this medium. Therefore, in light of the teachings in Zerda et al, it would have been obvious to one skilled in art at the time

Art Unit: 1796

invention was made to impregnate the MMA monomer into pores of nanosilica, of Pope et al, in the presence of supercritical CO<sub>2</sub>, for above mentioned advantages.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KARUNA P. REDDY whose telephone number is (571)272-6566. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571) 272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. P. R./  
Examiner, Art Unit 1796

/Vasu Jagannathan/  
Supervisory Patent Examiner, Art Unit 1796